

committee, and issued by Mr. Arrowsmith, of Bristol. In it is traced the institution from its inception (as the Bristol Library Society) in 1772 to the present day. The pamphlet, which is well worth perusal, is illustrated by some excellent process engravings.

THE Journal of the Royal Sanitary Institute for August contains the inaugural address delivered by Sir Edward Fry, president of the congress held last month; it contains also the lecture by Prof. C. Lloyd Morgan on "The Relation of Heredity to Physical Deterioration," and that on "The Wastage of Human Life" by W. Fleming Anderson.

THE July issue of the *Museums Journal* contains, in addition to its General Notes, the address on "The Education of a Curator," delivered at the Bristol conference of the Museums Association by Dr. W. E. Hoyle, the president of the conference.

A NEW book on the microscope, by Sir A. E. Wright, F.R.S., is announced for early publication by Messrs. Archibald Constable and Co., Ltd. The work will contain a complete vocabulary of technical terms relating to the microscope.

#### OUR ASTRONOMICAL COLUMN.

FINLAY'S COMET (1906d).—The results of a number of observations of Finlay's comet (1906d) are published in No. 4108 of the *Astronomische Nachrichten*.

At the Utrecht Observatory the comet was seen on July 21, and recorded as very faint; the observation showed that corrections of  $-12^m.58s.$  and  $-1^{\circ}51'$  were necessary to the ephemeris published by M. Fayet.

The magnitude of this object was found to be 9.0 when observed at Strassburg on July 17, its diameter being recorded as  $12'$ .

In No. 4109 of the *Astronomische Nachrichten* M. L. Schulhof states that the ephemeris derived from his elements shows a greater error than he had foreseen, an error which a superficial revision of his calculations for the perturbations has failed to discover. The comet appears to have suffered a retardation which as yet is unexplained.

Applying, provisionally, the corrections shown to be necessary by the Strassburg observation, he has calculated another ephemeris, from which the following is taken:—

##### Ephemeris 12h. (M.T. Paris).

1906	$\alpha$ (app.)			$\delta$ (app.)	$\log \Delta$	$1 : \mu^2 \Delta^2$
	h.	m.	s.			
Aug. 8 ...	2	47	36	... + 2 40	... 9.40344	... 13.72
10 ...	3	5	35	... + 4 23	... 9.40744	... 13.78
12 ...	3	23	6	... + 6 2	... 9.41390	... 13.67
14 ...	3	40	2	... + 7 35	... 9.42253	... 13.41
16 ...	3	56	17	... + 9 1	... 9.43301	... 13.03
18 ...	4	11	49	... + 10 21	... 9.44499	... 12.56

OBSERVATION OF A BRIGHT METEOR.—A communication by Herr Ph. Fauth in No. 4109 of the *Astronomische Nachrichten* states that a bright meteor was observed at Landstuhl on July 16.

The time of observation was 11h. 39m. (local M.T.), and the object appeared in the N.N.W. Its brightness was greater than that of the full moon, and its path was between  $12^{\circ}$  Canum Venaticorum and  $7^{\circ}$  Virginis. The duration of the light was about 1.5 seconds, and no detonation was noted.

DOUBLE-STAR MEASURES.—The results of the micrometer measures of double stars made with the 28-inch refractor at Greenwich during the year 1905 appear in No. 8, vol. lxi., of the *Monthly Notices* (R.A.S.).

In addition to a large number of stars contained in the ordinary working list, and for which the name, position, position-angle, distance, magnitudes, and epoch of observation are given, a number of Struve stars which have been

neglected, or for which periodical observations are required, were observed. Only the names of the latter are now published, the results of the measures being reserved for the *Greenwich observations* for 1905.

The measures now published are, in general, confined to stars of which the separation does not exceed  $4''$  or which show orbital movement.

In Nos. 4107–8 of the *Astronomische Nachrichten* Dr. G. van Biesbroeck publishes the results of the measures of 177 Struve stars made with the 12-inch refractor of the Heidelberg Astronomical Institute. The measures of twenty-nine comparison double stars are also given.

#### INTERNATIONAL CONFERENCE ON HYBRIDISATION AND PLANT-BREEDING.

THE Royal Horticultural Society held high festival in its new hall and elsewhere from July 30 to August 3. The occasion was the third conference on plant-breeding, previous gatherings having been held at Chiswick and in New York. Mr. William Bateson presided, and was so thoroughly imbued with his subject that the visitors found it difficult which to admire most, his grasp of difficult and complex problems, his able management, or his powers of endurance. The programme was a very long one, although some of the papers were, in the absence of their authors, taken as read. All the memoirs will be printed in full in the journal of the society. The speakers included, besides our own countrymen, Danes, Swedes, Germans, Austrians, French, and Americans.

"Mendelism" was naturally to the fore, and the numerous exhibits in illustration of the phenomena did more to secure general acceptance for the theory than did the elaborate disquisitions. Some of these, especially those of a mathematical character, evoked from the chairman the remark that we had reached the limits of our comprehension. In his introductory address Mr. Bateson gave a very interesting summary showing the advances that had been made since the first conference in 1898. The predominant note then was mystery—in 1906 we speak less of mystery and more of order.

Mr. Bateson suggests the adoption of the term "genetics" to indicate the nature of our researches into the phenomena of heredity and variation, in other words, the physiology of descent. He showed that we had already arrived at a clear conception of the true meaning of "pure-bred," pointing out that an individual is pure-bred when the two cells, male and female, from which it develops are alike in composition, containing identical elements or characters. Instead of regarding genetic purity as a vague state which may or may not be attainable by a long course of selection or fixation, we now know exactly what it is and how it is produced.

Similar explanations were given as to the significance of "reversion"; the reappearance of the ancient characters is brought about by the meeting together of distinct elements long parted, but how this is effected is still unexplained. Conversely, "variation" is often due to the separation or elimination of factors, and sometimes probably to the addition of new factors. Heredity is now known to be a regular phenomenon less or more amenable to experimental methods of research. When someone says, "But can't you breed a Derby winner or do something useful?" Mr. Bateson replies that "though in the attempt to discriminate among animals all good enough to win science may be as much at fault as common sense, yet it would not surprise me if science were to devise a way of breeding even racehorses which would not produce about a hundred 'wasters' for one fit to win—and yet I understand that common sense remains content with that rather modest attainment after two centuries and a half of steady trying." Mr. Bateson concluded by pointing out that the great advances in the application of science have generally become possible through discoveries made in the search for pure knowledge. In no other spirit can natural knowledge be more profitably pursued.

Other papers were contributed by Prof. Johannsen, of Copenhagen, whose views did not meet with universal acceptance, Messrs. Hurst, Darbishire, Yule, Dr. Wilson,

of St. Andrews. Mr. de Barri Crawshaw, Mr. Rolfe, and Prof. Pfister spoke on orchids; Mr. Chittenden and Dr. Tschermak dilated on questions of heredity. Prof. Rosenberg, of Stockholm, had a most important paper showing the behaviour of the chromosomes in hybrid plants. M. Noel Bernard spoke of the symbiosis existing between the roots of orchids and the hyphæ of certain fungi.

Miss Saunders, in a very lucid manner, explained the complex results she had obtained in crossing stocks, a paper the comprehension of which was much facilitated by the numerous specimens exhibited in the hall. Mr. Biffen contributed a remarkable paper on the application of Mendel's laws to the improvement of cultivated wheats, and various communications from raisers of carnations, potatoes, bulbs, roses, amaryllids, and other plants were read. The entire programme, with very few exceptions, was worked through under trying conditions of heat and street noises, and those who participated in the hard work honestly earned the recreation that was furnished them by garden-parties at Burford and Gunnersbury, to say nothing of the banquets offered to the foreign guests and other visitors by the Royal Horticultural Society and the Horticultural Club. The success of the conference was marked, and congratulations may be tendered to all who took part in its organisation.

#### MAN AND THE GLACIAL PERIOD.<sup>1</sup>

THE correlation of the successive occupation of Europe by various races of mankind with the successive events of the Glacial period has been greatly facilitated by the successful investigations of Prof. Albrecht Penck into the Quaternary history of the eastern Alps. Four well-defined terraces can be traced up the valleys of this region, each of them taking its origin in a terminal moraine. They represent the deposits of rivers issuing from the front of the ice during a glacial episode. Between the terraces the valleys show evidence of deepening by erosion during periods which correspond to genial intervals, the last of which, in order of time, is represented by the breccia of Hötting, when the temperature at Innsbruck, as shown by the included leaves and bracts of *Rhododendron ponticum*, was 3° C. higher than the average at the present day.

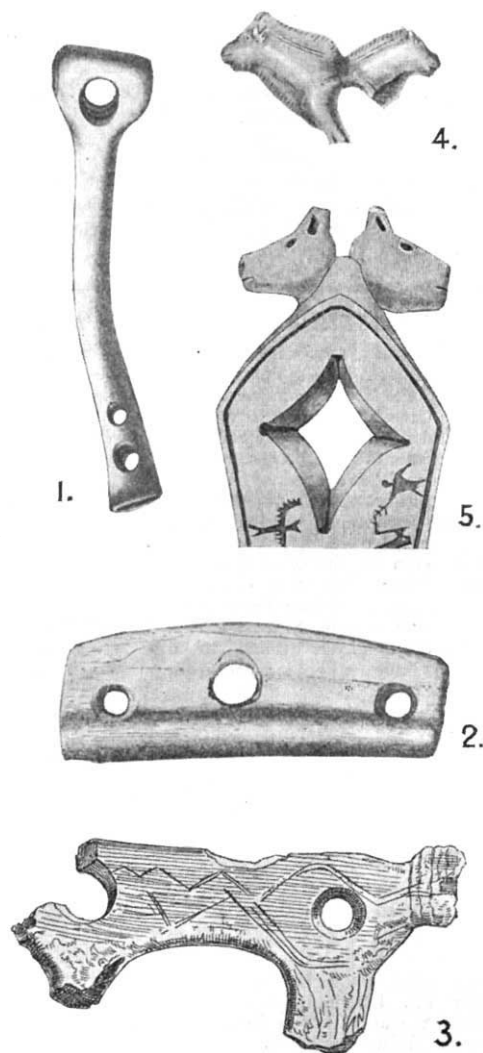
The earliest remains of the human family are afforded by *Pithecanthropus erectus* of Upper Pliocene age; the skull of this creature, while singularly simian in form, is shown to be human by its capacity (850 c.c.). Evidence supposed to indicate an even earlier existence of man-like species is afforded by the so-called "eoliths," but these it is now scarcely necessary to consider seriously, especially after the observations recently made on the eolithic forms which occur as a by-product in the manufacture of cement at Mantes. Probably 99 per cent. of the supposed implements obtained from the plateau gravels of southern England are of a doubtful character, but there is a small remainder, comprising forms distinguished by a notch, almost semi-circular in outline, which so closely resemble the scrapers once used among the Tasmanians for making their wooden spears that it seems most natural to regard them as of human origin.

The Tasmanians were the most unprogressive race in the world, and probably the oldest within the Australian region; their cranial capacity was 1160 c.c., and they were ulotrichous. It would hence appear that the cleavage between the Ulotrichi and the rest of the human species must have occurred at a very remote period.

The Chelléan stage of culture is represented by stone implements, which occur in the third fluvio-glacial terrace of southern France at the foot of the Pyrenees, and in possibly corresponding gravels in the valley of the Thames. The numerous skulls of Chelléan age which have been met with in cave deposits (Neanderthal, Spy, Krapina) agree in all essential features, and evidently belonged to a single race (*Homo primigenius* of Schwalbe), now most

nearly represented by the Australians. In cranial capacity there is a close agreement between the recent and extinct races (1250 c.c.).

The Solutrian stage follows upon the Chelléan, and implements representing it are found in the löss of the Danube, which occurs between the third and fourth fluvio-glacial terraces, and thus occupies an horizon corresponding to that of the Höttinger breccia. The Solutrian, or löss man, as the Germans sometimes call him, lived in a warm or genial climate. To the artists of this race are to be ascribed the drawings and paintings left upon the walls of numerous caves in France and Spain, which recall by their spirit and technique the work of the Bush-



1 and 2. Arrow straighteners used by Eskimos of Baffin Bay, after Boas.  
3. Arrow straightener of Magdalenian age, from the Kesslerloch, near Thayngen, after Merk, from Hoernes. 4. Head of a Magdalenian arrow straightener, after Lartet. 5. Head of an Eskimo arrow straightener, after Dawkins.

men in South Africa. The associated figurines carved in various material present two remarkable anatomical features (steatopygy and elongated labia minora) which are peculiar to South African races, so that, even without the evidence afforded by the Grimaldi skeletons in the Grotte des Enfants, Mentone, we might safely regard the Solutrian race as ancestral to the Bushmen or some allied

<sup>1</sup> An abstract of three lectures delivered at the Royal Institution on May 24, 31, June 7, by Prof. Sollas, F.R.S.